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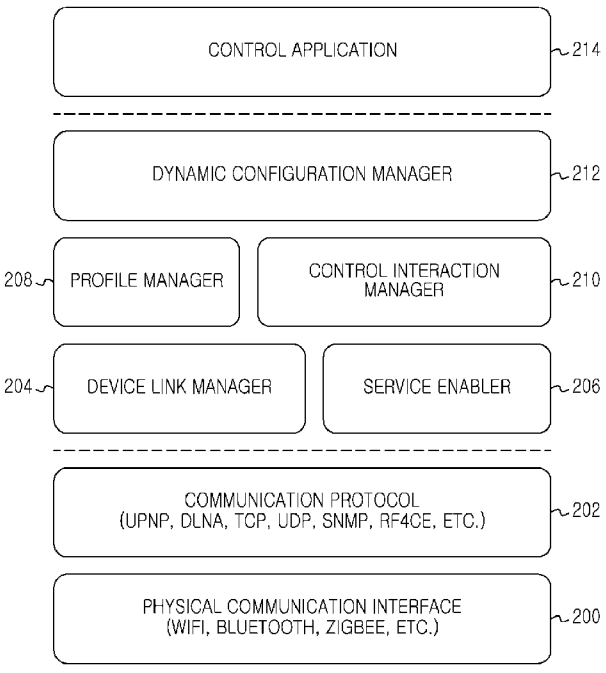
(54) Title: APPARATUS AND METHOD FOR REMOTELY CONTROLLING PERIPHERAL DEVICES IN MOBILE COMMUNICATION TERMINAL

(57) Abstract: According to one embodiment, a method for remotely controlling peripheral devices in a mobile communication terminal includes acquiring a profile for a controlled device, configuring a control application for the controlled device based on the acquired profile, and controlling the controlled device using the configured control application.

[Fig. 2]



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Description

Title of Invention: APPARATUS AND METHOD FOR REMOTELY CONTROLLING PERIPHERAL DEVICES IN MOBILE COMMUNICATION TERMINAL

Technical Field

[1] The present invention relates to a mobile communication terminal, and more particularly, to an apparatus and method for remotely controlling peripheral devices in a mobile communication terminal.

Background Art

[2] Information Technology (IT) convergence that includes characteristics between devices are intimately connected to each other, and new consumption contents that are created have become important to the IT industry. Also, devices have evolved from a device with firmware for single function to devices capable of embedding an Operating System (OS) and using many services for various purposes. For example, these newer devices may often include smart TV and tablet PC functionality.

[3] Because it is possible to perform communication between devices through a variety of communication methods using a device with an OS and a network interface, it may be possible to provide a new service without the addition of physical device. That is, new services may be implemented on these converged devices using mostly software. Thus, it may be possible to provide services for controlling peripheral devices using a mobile device such as a smart phone through a representative function among these convergence functions. For example, a TV remote control function, a home theater control function, a car remote control function, a PC mouse keyboard function, etc. may be performed using a smart phone. Because each remote controller may have a physical input device customized to function with a corresponding device, there may be a disadvantage in which multiple physical remote controllers are required to control their respective devices. In order to solve the disadvantage, the functions of multiple remote controllers may be performed by the mobile device such as a smart phone. The mobile device may store instructions associated with the functions of multiple remote controllers to be used by its user. Herein, the mobile device may be a general term for a variety of devices, having an OS function and a communication network function, such as a mobile phone, a Personal Digital Assistants (PDA), a smart phone, a tablet Personal Computer (PC), and a notebook.

[4] In order to remotely control a peripheral controlled device using a conventional mobile device, the user is often required to connect to an external server, download a suitable control application from the external server, and install the control application

in the mobile device. Also, in order to control different controlled devices using the conventional mobile device, an application for each controlled device is often required to exist in the conventional mobile device. Accordingly, if the user does not remember where the remote controller is, he or she may spend a lot of time to find the remote controller.

[5] Also, the conventional mobile device may control only a few functions of a controlled device (e.g., a volume and channel change function of a TV). Accordingly, the conventional mobile device does not correspond to optimized control & interaction corresponding to a smart service application which may be emerging, such as, a service application executed in a device having an OS such as a smart TV and a tablet PC. In other words, because the conventional mobile device like a general TV remote controller unidirectionally transmits a control signal or displays only information about a simple operation state, it may not provide optimized control methods of different applications executed in a device such as a smart TV. For example, in the smart TV, applications such as a game application, an explorer application, a magazine application, a messenger application, and a multimedia application exist. The conventional mobile device such as the general TV remote controller may not control these diverse applications easily and quickly.

[6] Also, in order to control a variety of applications for each controlled device using the conventional mobile device, because the whole process to a program design, a User Interface (UI) task, and function implementation for each corresponding control application must be developed, a lot of investment cost and time is needed.

Disclosure of Invention

Solution to Problem

[7] To address the above-discussed deficiencies of the prior art, it is a primary object to provide at least the advantages described below. Accordingly, an aspect of the present invention is to provide an apparatus and method for remotely controlling peripheral devices in a mobile communication terminal.

[8] Another aspect of the present invention is to provide an apparatus and method for configuring one integrated control application based on a profile with respect to a variety of peripheral controllable devices and remotely controlling a controlled device using the configured control application.

[9] In accordance with another aspect of the present invention, a method of controlling peripheral devices in a mobile communication terminal includes acquiring a profile for a controlled device, configuring a control application for the controlled device based on the acquired profile, and controlling the controlled device using the configured control application.

[10] In accordance with another aspect of the present invention, an apparatus for controlling peripheral devices in a mobile communication terminal includes a profile manager for acquiring a profile for a controlled device, a dynamic configuration manager for configuring a control application for the controlled device based on the acquired profile, and a control interaction manager for controlling the controlled device using the configured control application.

[11] Before undertaking the DETAILED DESCRIPTION OF THE INVENTION below, it may be advantageous to set forth definitions of certain words and phrases used throughout this patent document: the terms "include" and "comprise," as well as derivatives thereof, mean inclusion without limitation; the term "or," is inclusive, meaning and/or; the phrases "associated with" and "associated therewith," as well as derivatives thereof, may mean to include, be included within, interconnect with, contain, be contained within, connect to or with, couple to or with, be communicable with, cooperate with, interleave, juxtapose, be proximate to, be bound to or with, have, have a property of, or the like; and the term "controller" means any device, system or part thereof that controls at least one operation, such a device may be implemented in hardware, firmware or software, or some combination of at least two of the same. It should be noted that the functionality associated with any particular controller may be centralized or distributed, whether locally or remotely. Definitions for certain words and phrases are provided throughout this patent document, those of ordinary skill in the art should understand that in many, if not most instances, such definitions apply to prior, as well as future uses of such defined words and phrases.

Brief Description of Drawings

[12] For a more complete understanding of the present disclosure and its advantages, reference is now made to the following description taken in conjunction with the accompanying drawings, in which like reference numerals represent like parts:

[13] FIGURE 1 illustrates an example mobile communication terminal and a peripheral controlled device according to one embodiment of the present disclosure;

[14] FIGURE 2 illustrates example devices of a mobile communication terminal according to one embodiment of the present disclosure;

[15] FIGURE 3 illustrates an example process of remotely controlling peripheral devices in a mobile communication terminal according to one embodiment of the present disclosure; and

[16] FIGURE 4 illustrates example image information and layout information of objects configuring a picture according to one embodiment of the present disclosure.

Best Mode for Carrying out the Invention

[17] FIGURES 1 through 4, discussed below, and the various embodiments used to

describe the principles of the present disclosure in this patent document are by way of illustration only and should not be construed in any way to limit the scope of the disclosure. Those skilled in the art will understand that the principles of the present disclosure may be implemented in any suitably arranged mobile communication terminal. Exemplary embodiments of the present invention will be described herein below with reference to the accompanying drawings. In the following description, well-known functions or constructions are not described in detail since they would obscure the invention in unnecessary detail. Also, the terms used herein are defined according to the functions of the present invention. Thus, the terms may vary depending on user's or operator's intension and usage. That is, the terms used herein must be understood based on the descriptions made herein.

[18] Hereinafter, an apparatus and method for remotely controlling peripheral devices in a mobile communication terminal according to an exemplary embodiment of the present invention will be described in detail. Hereinafter, the present invention will be described with reference to a terminal. However, the prevent invention may be applied to all mobile devices capable of controlling applications of peripheral devices.

[19] FIGURE 1 illustrates a mobile communication terminal and peripheral controlled devices according to the present invention. Mobile communication terminal includes a terminal 100 having input, display, and communication functions. The terminal 100 communicates with peripheral controlled devices 110, 120, and 130, acquires profiles of the peripheral controlled devices 110, 120, and 130, and configures one integrated control application using the acquired profiles. The terminal 100 remotely controls applications (or services) of the corresponding peripheral controlled devices 110, 120, and 130 using the configured integrated control application.

[20] A profile server (not shown) manages profiles of the respective controlled devices 110, 120, and 130 and provides the profiles of the controlled devices 110, 120, and 130 to the terminal 100 according to request of the terminal 100. The profile server may be an external server or may be a local server . In certain embodiments, the controlled devices 110, 120, and 130 may manage their own profiles without the separate profile server. In this case, the profiles of the controlled devices 110, 120, and 130 may be provided to the terminal 100 using a Peer to Peer (P2P) type protocol through direct connection between the terminal 100 and the controlled devices 110, 120, and 130.

[21] FIGURE 2 illustrates an example mobile communication terminal according to one embodiment of the present invention. The mobile communication terminal includes a physical communication interface 200, a communication protocol 202, a device link manager 204, a service enabler 206, a profile manager 208, a control interaction manager 210, a dynamic configuration manager 212, and a control application 214. The physical communication interface 200 communicates with peripheral controlled

devices through transmission means such as Wi-Fi, Bluetooth, and Zigbee. The communication protocol 202 may include a data transfer protocol such as a Universal Plug and Play (UPnP), a Digital Living Network Alliance (DLNA), a Transmission Control Protocol (TCP), a User Datagram Protocol (UDP), a Simple Network Management Protocol (SNMP), and a Radio Frequency for Consumer Electronics (RF4CE).

[22] The device link manager 204 searches the peripheral controlled devices. Particularly, the device link manager 204 may broadcast a search request message to the peripheral controlled devices and receive response messages for the search request message from the peripheral controlled devices, using the communication protocol 202 and the physical communication interface 200. Each of the response messages may include information related to a corresponding controlled device. For example, the information related to the controlled device may include a variety of information such as a device name, a model name, a device type, such as for indicating whether to control a device, a network address, and a service name, a service kind, an application name, and an application kind. Also, the device link manager 204 extracts the information related to the controlled devices from each of the response messages received according to the peripheral controlled devices and displays a controlled device list on a picture based on the extracted information related to the controlled devices.

[23] The service enabler 206 searches services or applications performed in the peripheral controlled devices. Particularly, the service enabler 206 broadcasts a search request message to the peripheral controlled devices and receives response messages for the search request message from the peripheral controlled devices, using the communication protocol 202 and the physical communication interface 200. Each of the response messages includes information about a service or an application which is currently performed or changed from a corresponding controlled device.

[24] If a profile of the controlled device does not exist in a memory (not shown), the profile manager 208 requests a profile server to transmit the profile of the corresponding controlled device, receives the corresponding profile from the profile server, and stores and manages the received profile in the memory (not shown) of the controlled device. In one embodiment, the profile includes User Interface (UI) information for configuring a picture and control command information to be registered in objects. Also, the profile may include a communication protocol. The UI information includes image information and layout information of the objects that may be used for configuring the picture. For example, as shown in FIGURE 4, the objects may be objects of various types, such as a button, a touch input, a gesture input, a sensor input, a file list, a moving picture, and music, which may be provided to a user through a terminal.

[25] Referring again to FIGURE 2, the control interaction manager 210 remotely controls

a controlled device using a configured control application 214. That is, if the user selects an image of an object arranged on the picture, the control interaction manager 210 verifies control command information mapped to the image of the object, processes the verified control command information according to a communication protocol (e.g., standards of a TCP, a UDP, a UPnP, etc.) defined in a corresponding profile, and transmits the processed control command information to a corresponding controlled device. Also, if information is received from the corresponding controlled device, the control interaction manager 210 analyzes the received information, compares the analyzed information with registered control command information, and performs an operation associated with the object selected by the user.

[26] The dynamic configuration manager 212 analyzes a profile of a controlled device and configures the control application 214 for the controlled device in real time based on the analyzed result. That is, the dynamic configuration manager 212 extracts UI information for configuring a picture and control command information to be registered in an object from the profile of the controlled device, arranges an image of each object on the picture using the extracted UI information, connects the extracted control command information to each object, maps the image of each object arranged on the picture to the control command information for each object, and registers the mapped information.

[27] FIGURE 3 illustrates an example process of remotely controlling peripheral devices in a mobile communication terminal according to one embodiment of the present invention. In step 301, a terminal determines whether a communication control application execution menu is selected according to a key selected by a user.

[28] If the communication control application execution menu is selected in step 301, the terminal broadcasts a search request message to peripheral controlled devices to ascertain whether the controlled devices exist within a controllable range in step 303. In one embodiment, the terminal broadcasts the search request message to the peripheral controlled devices, using one or more physical communication interfaces (e.g., Wi-Fi, Bluetooth, Zigbee, etc.) and various communication protocols (e.g., a UPnP, a DLNA, a TCP, a UDP, an SNMP, an RF4CE, etc.) for each device. In this particular embodiment, the peripheral controlled devices include all of a device in which a control function for the corresponding device are configured in the terminal and a device in which a control function for the corresponding device does not initially exist in the terminal.

[29] The terminal determines whether response messages for the search request message are received from the peripheral controlled devices in step 305. In one embodiment, each of the response messages includes information related to a corresponding controlled device. For example, the information related to the controlled device may

include a variety of information such as a device name, a model name, a device type (for indicating whether to control a device), a network address, a service name, a service kind, an application name, and an application kind.

[30] When the response messages for the search request message are received from the peripheral controlled devices in step 305, the terminal verifies that the controlled devices exist within their controllable range. In step 307, the terminal extracts information related to the controlled device from each of the response messages received according to the peripheral controlled devices and displays a controlled device list on a picture based on the extracted information related to each controlled device.

[31] In step 309, the terminal determines whether one controlled device is selected on the controlled device list displayed on the picture according to a key selected by the user.

[32] When the one controlled device is selected on the controlled device list displayed on the picture in step 309, the terminal determines whether a profile of the selected controlled device exists in a memory using information related to the selected controlled device in step 311.

[33] When the profile of the selected controlled device exists in the memory in step 311, the terminal proceeds to step 315. Although FIGURE 3 does not illustrate that the profile of the selected controlled device exist in the memory, if the profile of the selected controlled device exists in the memory, the terminal transmits version information of the profile that exists in the memory to the profile server. If a newly updated profile exists in the profile server, the terminal receives the newly updated profile from the profile server and may updates the profile that exists in the memory.

[34] Meanwhile, when the profile of the selected controlled device does not exist in the memory in step 311, the terminal requests the profile server to transmit the profile of the selected controlled device using the information related to the selected controlled device, for example, using a device name and receives the profile of the selected controlled device from the profile server. At this time, the profile server may search the profile of the selected controlled device using the information received from the terminal and may transmit the searched profile to the terminal.

[35] In step 315, the terminal analyzes the profile of the controlled device, which exists in the memory or is received from the profile server, configures a control application for the selected controlled device in real time based on the analyzed result, and displays the configured control application as a picture on the UI of the terminal. In one embodiment, the profile includes UI information for configuring the picture and control command information to be registered in objects. Also, the profile may include a communication protocol in addition to them. The UI information includes image information and layout information of objects for configuring the picture. For example, as shown in FIGURE 4, the objects may include objects of diverse types, which may

be provided to the user through the terminal, such as a button, a touch input, a gesture input, a sensor input, a file list, a moving picture, and music. That is, the terminal may extract the UI information for configuring the picture and the control command information to be registered in the objects from the profile of the controlled device, arrange images of the respective objects on the picture using the extracted UI information, and connect the extracted control command information to the respective objects. The terminal may also map the images of the respective objects arranged on the picture to the control command information for the respective objects and registers the mapped information.

[36] In step 317, the terminal may remotely control the selected controlled device according to a selected operation of the user using the configured control application. That is, if the user selects the image of the object arranged on the picture, the terminal may then verify control command information mapped to the image of the object, process the verified control command information according to a communication protocol (e.g., standards of a TCP, a UDP, a UPnP, etc.) defined in a corresponding profile, and transmit the processed control command information to a corresponding controlled device. Also, if information is received from the corresponding controlled device, the terminal analyzes the received information, compares the analyzed information with registered control command information, and performs a suitable operation.

[37] Thereafter, the terminal ends the process of FIGURE 3.

[38] Although FIGURE 3 does not illustrate that a controlled device executes any application (or service) while the terminal remotely controls the controlled device; however, if the controlled device executes any application (or service) while the terminal remotely controls the controlled device, the terminal may automatically configure the optimum control application capable of interacting with a corresponding application. The terminal may acquire a profile or profile identifier of a service or application which is currently performed or changed from a corresponding controlled device (e.g. search for it from the memory or request the profile server to receive it) and configure a control application capable of providing the optimum control function to the user in real time. For example, if a personal computer (PC) functioning as a controlled device is searched and selected, the terminal may configure a control application related to a mouse and keyboard function of the PC based on a profile of the PC and may remotely control the PC using the configured control application. If the PC executes an application such as Media Player or Power Point, it may transmit a profile or profile identifier of the corresponding application to the terminal to allow the terminal to acquire the corresponding profile (e.g. search for it from the memory or request the profile server to receive it) and configure the control application capable of

providing the optimum control function to the user based on the acquired profile. That is, when the Media Player is executed in the PC, the terminal provides a control function for the Media Player to the user based on a profile in which information such as reproduction information, pause information, and volume adjustment information is loaded. When the Power Point is executed in the PC, the terminal may provide control functions such as a mode change function, a previous page change function, and a next page change function.

[39] The present invention may reduce the burden connecting to an external server, download a control application for controlling different controlled device, and install the control application in the terminal by configuring one integrated control application based on a profile with respect to a variety of peripheral controllable devices. Also, because a variety of controllable devices and applications (or services) may be managed on one picture, the present invention may have an advantage in that the variety of devices and applications (or services) may be controlled with a single integrated control application without selecting and executing a control application suitable for a controlled device among multiple control applications.

[40] Also, because a control application for a new device (service or application) may be simply provided through profile acquisition and update without additional development of a device using search, control protocol, and control functions, the present invention may provide an advantage in that development resources may be reduced. Also, because there is no need to separately develop a control application according to each model, and provide the developed control application to the user with respect to a product which provides a variety of functions specialized according to each model even if the product is one product group, the present invention may have an advantage in that management and distribution of the control application may be quickly and conveniently performed.

[41] While the present invention has been particularly shown and described with reference to exemplary embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the appended claims.

Claims

[Claim 1] A method of controlling peripheral devices in a mobile communication terminal, the method comprising:
acquiring a profile for a controlled device;
configuring a control application for the controlled device based on the acquired profile; and
controlling the controlled device using the configured control application.

[Claim 2] The method of claim 1, further comprising:
determining whether a control application execution menu is selected;
broadcasting a search request message to one or more peripheral controlled devices when the control application execution menu is selected;
receiving response messages from the peripheral controlled devices, wherein each of the response messages includes information related to a corresponding controlled device, and the information related to the controlled device includes at least one of a device name, a model name, a device type, a network address, a service name, a service kind, an application name, and an application kind;
extracting the information related to the controlled device from each of the response messages received according to the peripheral controlled devices; and
displaying a controlled device list as a picture on a user interface (UI) of the terminal based on the extracted information related to the controlled device.

[Claim 3] The method of claim 2, wherein the acquisition of the profile comprises:
determining whether one controlled device is selected on the displayed controlled device list;
determining whether a profile of the selected controlled device exists in a memory of the terminal using information related to the selected controlled device when the one controlled device is selected; and
requesting a profile server to transmit the profile of the selected controlled device using the information related to the selected controlled device and receiving the requested profile of the selected controlled device when the profile of the selected controlled device does not exist in the memory.

[Claim 4] The method of claim 3, further comprising:
transmitting version information of the profile which exists in the memory to the profile server when the profile of the selected controlled device exists in the memory; and
receiving a newly updated profile from the profile server.

[Claim 5] The method of claim 2, further comprising:
transmitting and receiving the search request message and the response message based on a predetermined physical communication interface and communication protocol, the physical communication interface includes at least one of Wi-Fi, Bluetooth, and Zigbee, and the communication protocol includes at least one of a UPnP, a DLNA, a TCP, a UDP, an SNMP, and an RF4CE.

[Claim 6] The method of claim 1, wherein the profile includes at least one of UI information for configuring a picture, control command information to be registered in objects, and a communication protocol, and the UI information includes at least one of image information and layout information of the objects configuring the picture.

[Claim 7] The method of claim 6, wherein the configuration of the control application comprises:
extracting the UI information for configuring the picture and the control command information registered in objects from the profile of the controlled device;
arranging images of the respective objects on the picture using the extracted UI information and connecting the extracted control command information to the respective objects; and
mapping the images of the respective objects arranged on the picture to the control command information for the respective objects.

[Claim 8] The method of claim 1, further comprising:
acquiring a profile of a currently performed or changed service or application from the controlled device while controlling the controlled device.

[Claim 9] An apparatus for controlling peripheral devices in a mobile communication terminal, the apparatus comprising:
a profile manager for acquiring a profile for a controlled device;
a dynamic configuration manager for configuring a control application for the controlled device based on the acquired profile; and
a control interaction manager for controlling the controlled device using the configured control application.

[Claim 10] The apparatus of claim 9, further comprising a device link manager for determining whether a control application execution menu is selected, broadcasting a search request message to peripheral controlled devices when the control application execution menu is selected, receiving response messages from the peripheral controlled devices, extracting information related to the controlled device from each of the response messages received according to the peripheral controlled devices, and displaying a controlled device list as a picture on a user interface (UI) of the terminal based on the extracted information related to the controlled device, wherein each of the response messages includes information related to a corresponding controlled device, and the information related to the controlled device includes at least one of a device name, a model name, a device type, a network address, a service name, a service kind, an application name, and an application kind.

[Claim 11] The apparatus of claim 10, wherein the profile manager is configured to determine whether one controlled device is selected on the displayed controlled device list, determine whether a profile of the selected controlled device exists in a memory using information related to the selected controlled device when the one controlled device is selected, requests a profile server to transmit the profile of the selected controlled device using the information related to the selected controlled device when the profile of the selected controlled device does not exist in the memory, and receive the requested profile of the selected controlled device.

[Claim 12] The apparatus of claim 11, wherein the profile manager is configured to transmit version information of the profile which exists in the memory to the profile server when the profile of the selected controlled device exists in the memory and receive a newly updated profile from the profile server.

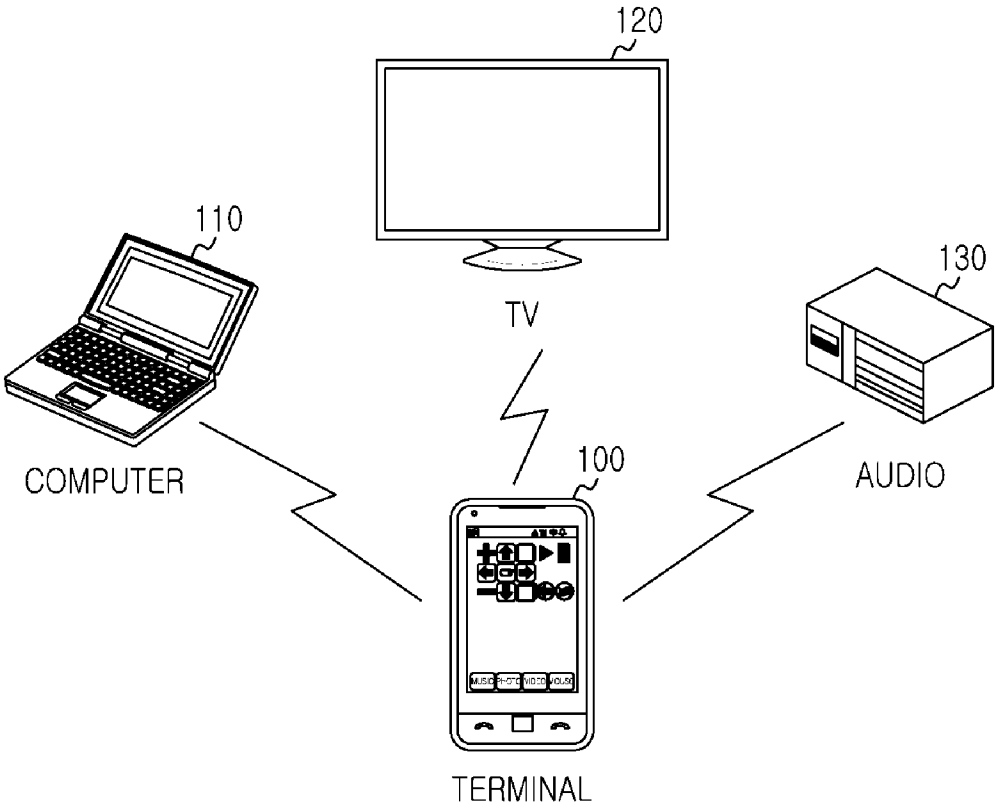
[Claim 13] The apparatus of claim 10, wherein the search request message and the response message are configured to be transmitted and received based on a predetermined physical communication interface and communication protocol, the physical communication interface includes at least one of Wi-Fi, Bluetooth, and Zigbee, and the communication protocol includes at least one of a UPnP, a DLNA, a TCP, a UDP, an SNMP, and an RF4CE.

[Claim 14] The apparatus of claim 9, wherein the profile includes at least one of UI information for configuring a picture, control command information to

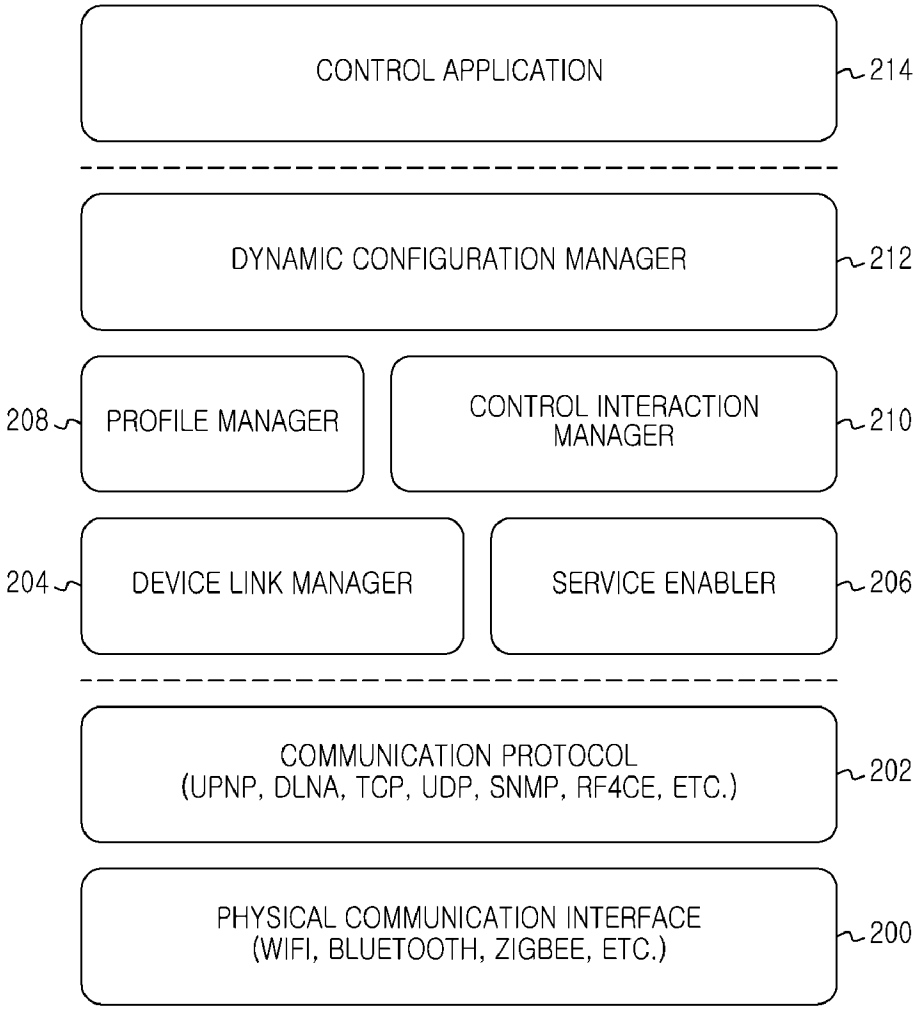
be registered in objects, and a communication protocol, and the UI information includes at least one of image information and layout information of the objects configuring the picture.

[Claim 15] The apparatus of claim 14, wherein the dynamic configuration manager is configured to extract the UI information for configuring the picture and the control command information registered in objects from the profile of the controlled device, arrange images of the respective objects on the picture using the extracted UI information, connect the extracted control command information to the respective objects, and map the images of the respective objects arranged on the picture to the control command information for the respective objects.

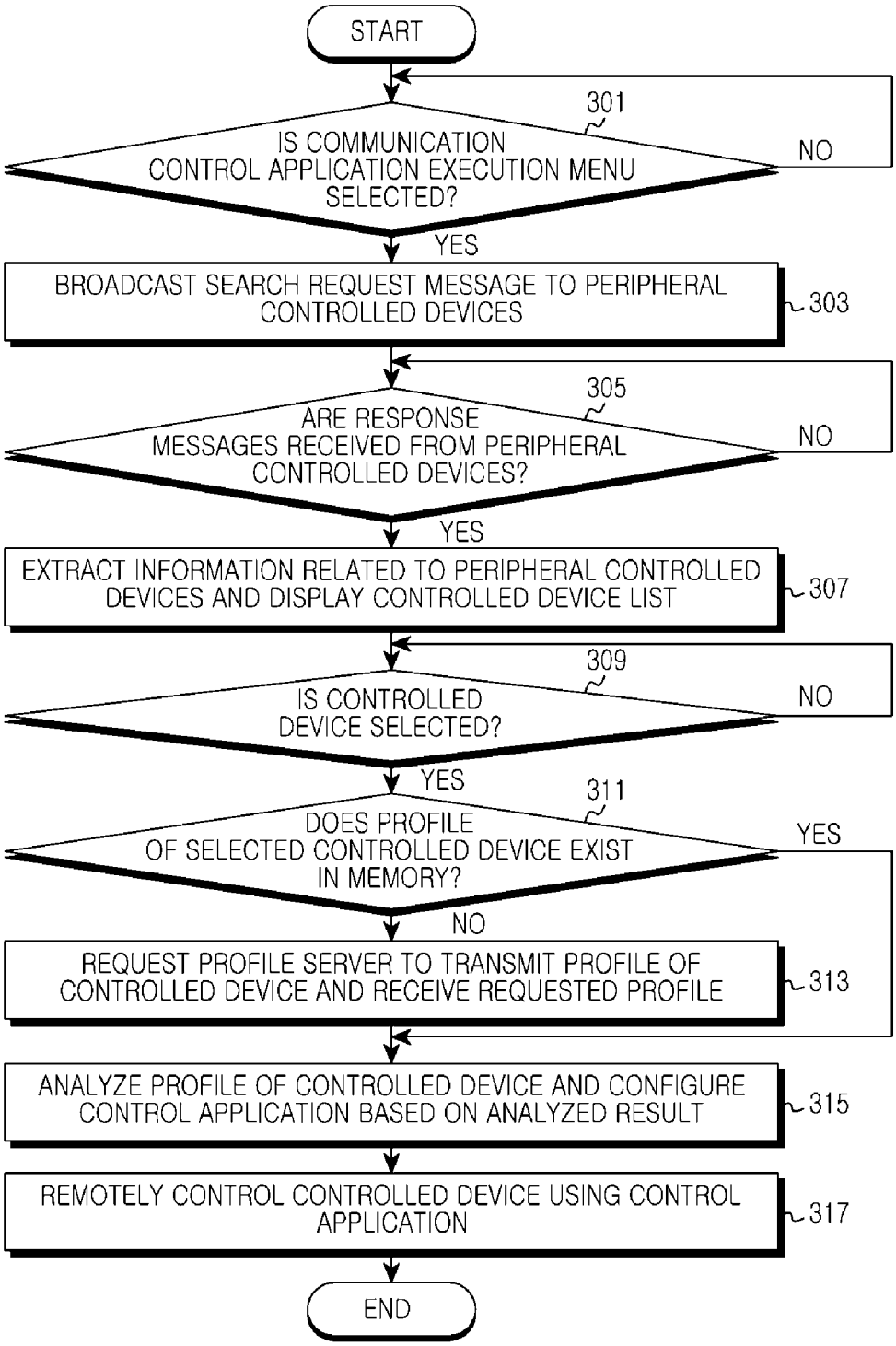
[Fig. 1]



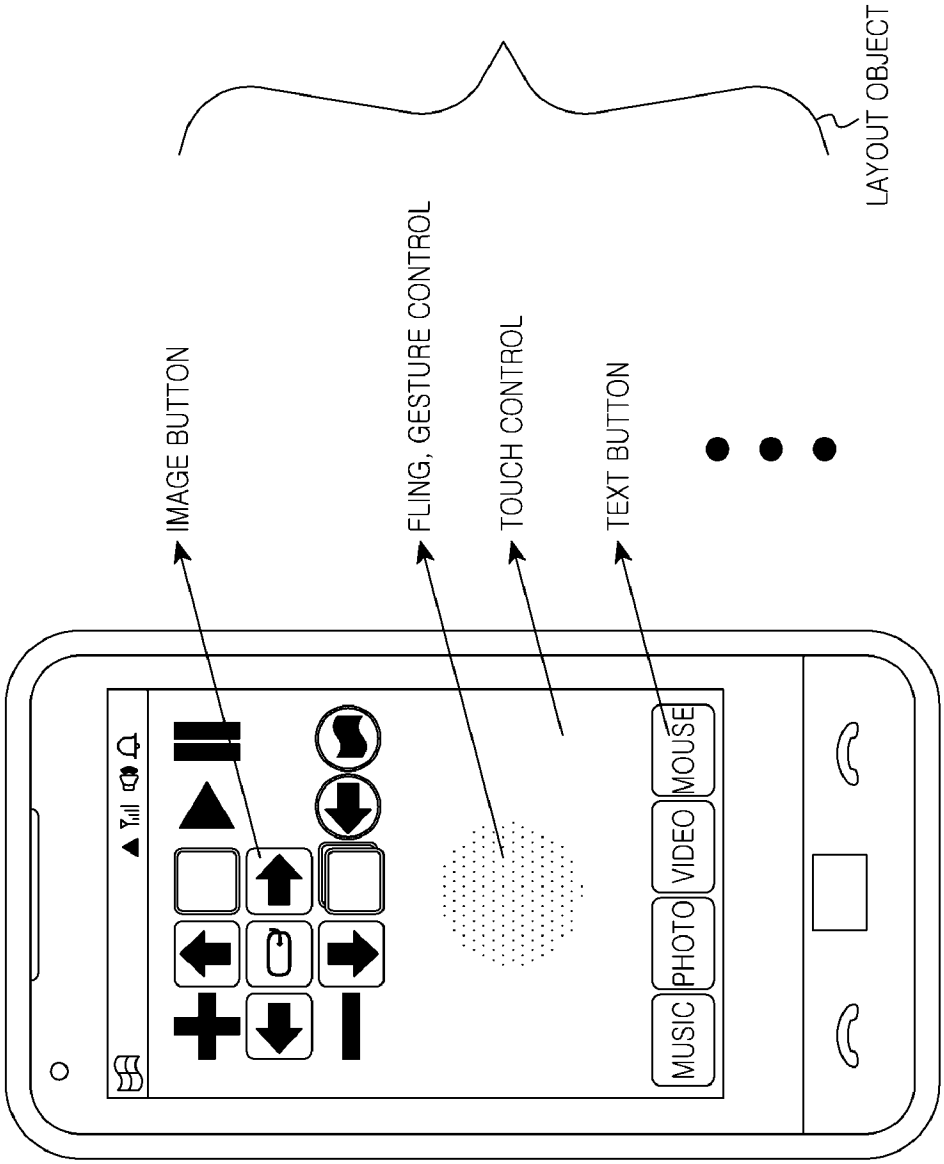
[Fig. 2]


CONTROL APPLICATION
214
DYNAMIC CONFIGURATION MANAGER
212
208
PROFILE MANAGER
CONTROL INTERACTION MANAGER
210
204
DEVICE LINK MANAGER
SERVICE ENABLER
206
COMMUNICATION PROTOCOL
(UPNP, DLNA, TCP, UDP, SNMP, RF4CE, ETC.)
202
PHYSICAL COMMUNICATION INTERFACE
(WIFI, BLUETOOTH, ZIGBEE, ETC.)
200

[Fig. 3]


START
301
IS COMMUNICATION CONTROL APPLICATION EXECUTION MENU SELECTED?
NO
YES
BROADCAST SEARCH REQUEST MESSAGE TO PERIPHERAL CONTROLLED DEVICES
303
305
ARE RESPONSE MESSAGES RECEIVED FROM PERIPHERAL CONTROLLED DEVICES?
NO
YES
EXTRACT INFORMATION RELATED TO PERIPHERAL CONTROLLED DEVICES AND DISPLAY CONTROLLED DEVICE LIST
307
309
IS CONTROLLED DEVICE SELECTED?
NO
YES
311
DOES PROFILE OF SELECTED CONTROLLED DEVICE EXIST IN MEMORY?
YES
NO
REQUEST PROFILE SERVER TO TRANSMIT PROFILE OF CONTROLLED DEVICE AND RECEIVE REQUESTED PROFILE
313
ANALYZE PROFILE OF CONTROLLED DEVICE AND CONFIGURE CONTROL APPLICATION BASED ON ANALYZED RESULT
315
REMOTELY CONTROL CONTROLLED DEVICE USING CONTROL APPLICATION
317
END

[Fig. 4]


LAYOUT OBJECT
IMAGE BUTTON
FLING, GESTURE CONTROL
TOUCH CONTROL
TEXT BUTTON
MUSIC
PHOTO
VIDEO
MOUSE